PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 48558-PT	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/CA 03/02002	International filing date *(day/month/year)* 22.12.2003	Priority date *(day/month/year)* 23.12.2002
International Patent Classification (IPC) or both national classification and IPC F28F21/08		
Applicant ALCAN INTERNATIONAL LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20.07.2004	05.04.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Bain, D Telephone No. +49 89 2399-7252

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA 03/02002

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-15 as originally filed

Claims, Numbers

1-8 filed with telefax on 17.03.2005

Drawings, Sheets

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA 03/02002

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-8
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-8
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-8
	No:	Claims	

2. Citations and explanations

   see separate sheet

INTERNATIONAL PRELIMINARY EXAMINATION REPORT - SEPARATE SHEET

International application No. PCT/CA 03/02002

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents :
D1: US 3,878,871
D2: US 6,391,129

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 , and shows (the references in parentheses applying to this document):
a corrosion resistant aluminium alloy with the same composition as the one of claim 1.

The subject-matter of claim 1 differs from this known alloy in that it is homogenized at a temperature between 580 and 620°C and then extruded into a tubing and brazed.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT) (same considerations for independent claims 2 and 3).

The temperature range for the homogenization is to be found in D2 also relating to an aluminium alloy of a different composition.

Nevertheless, there is no indications to be found in the state of the art, that would lead the skilled man in the art to such a combination of features.

Therefore, the subject-matter of claim 1 involves an inventive step (same considerations for claims 2 and 3).

Claims 4 to 8 are dependent on claim 3 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Claims:

1. An aluminum alloy for heat exchanger tubing comprising 0.4 to 1.1% by weight manganese, up to 0.01% by weight copper, up to 0.05% by weight zinc, up to 0.2% by weight iron, up to 0.2% by weight silicon, up to 0.01% by weight nickel, up to 0.05% by weight titanium and the balance aluminum and incidental impurities, wherein said alloy has been homogenized at a temperature of between 580 and 620°C and extruded into tubing and brazed.

2. Brazed extruded heat exchanger tubing formed from an aluminum alloy comprising 0.4 to 1.1% by weight manganese, up to 0.01% by weight copper, up to 0.05% by weight zinc, up to 0.2% by weight iron, up to 0.2% by weight silicon, up to 0.01% by weight nickel, up to 0.05% by weight titanium and the balance aluminum and incidental impurities.

3. A brazed heat exchanger assembly comprising joined heat exchanger tubes and heat exchange fins wherein the tubes are extruded tubes formed of a first aluminum alloy comprising 0.4 to 1.1% percent by weight manganese, up to 0.01% by weight copper, up to 0.05% by weight zinc, up to 0.2% by weight iron, up to 0.2% by weight silicon, up to 0.01% by weight nickel and the balance aluminum and incidental impurities and the fins are formed of a second aluminum alloy selected from the group consisting of an alloy comprising 0.9 to 1.5% by weight manganese and an alloy of the AA3003 type, said second aluminum alloy further containing at least 0.5%

by weight zinc, whereby the brazed tubes exhibit good self corrosion protection and the fins are galvanically sacrificial relative to the tubes.

4. A brazed heat exchanger assembly according to claim 3 wherein the difference between the manganese content of the first aluminum alloy is related to the manganese content of the second aluminum alloy by the formula

$$Mn_{tube}\ (wt\%) > Mn_{fin}\ (wt\%) - 0.8\ wt\%$$

where Mn_{tube} is the manganese content of the first aluminum alloy and Mn_{fin} is the manganese content of the second aluminum alloy.

5. A brazed heat exchanger assembly according to claim 3 or 4 wherein the second aluminum alloy contains less than 0.05% by weight copper.

6. A brazed heat exchanger assembly according to claim 3, 4 or 5 where the galvanic current from fin to tube is greater than +0.05 microamps per square centimeter.

7. A brazed heat exchanger assembly according to any one of claims 3 to 6 where the first aluminum alloy contains between 0.6 and 1.19% by weight manganese.

8. A brazed heat exchanger assembly according to claim 7 where the first aluminum alloy contains between 0.9 and 1.1% by weight manganese.